

بكالوريوس

Course No: IGGC2302

Course Title:

Operations Research

Date: 15 / 08 / 2011

No. of Questions: 5 Questions

Time: 3 hours

Using Calculator (Yes)

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

University of Palestine



Final Exam

3st quadmester 2010/2011

Total Grade: 60

Instructor Name: Eng. Ahmed H. Abo
absa

Student No.: _____

Student Name: _____

College Name: _____

Dep. / Specialist: _____

Using Dictionary (No)

First Question

No. of Branches (2)

(25/60)

If the LP of the company is

Maximize $Z = 115x_1 + 90x_2$

s.t.

$10x_1 + 20x_2 \leq 200$ (pine availability)

$4x_1 + 16x_2 \leq 128$ (cedar availability)

$15x_1 + 10x_2 \leq 220$ (maple availability)

$x_1, x_2 \geq 0$ (non negativity)

Where x_1 = No. of rolltop desks to be produced and x_2 = No. of regular desks to be produced.

a) Graphically find the optimal product mix and the corresponding profit. Which constraints are active and which ones inactive at the optimum?

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b) Write out the corresponding dual problem

c) How much can we increase or decrease the coefficient in the variable x_1 without changing the optimal CPF solution?

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d) Use simplex method to find the optimal solution.

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Using Dictionary (No)

Second Question

No. of Branches (3)

(15/60)

Faced with a court order to desegregate its schools, a county school board decides to redistribute its minority students through busing. The plan calls for busing 50 students from each of the three cities- A, B and C , to four schools- E, W, N and S. For a perfect desegregation, the schools need 20, 40, 30, and 60 minority students respectively. The dollar cost for busing each student is given as follows:
Set up the transportation table for this problem

1. Formulate this as a **balanced** transportation problem.

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Using Dictionary (No)

2. Use VAM method to find the initial basic visible solution.

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Using Dictionary (No)

3. Use UV method to find the optimal solution.

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Using Dictionary (No)

Fourth Question

No. of Branches (1)

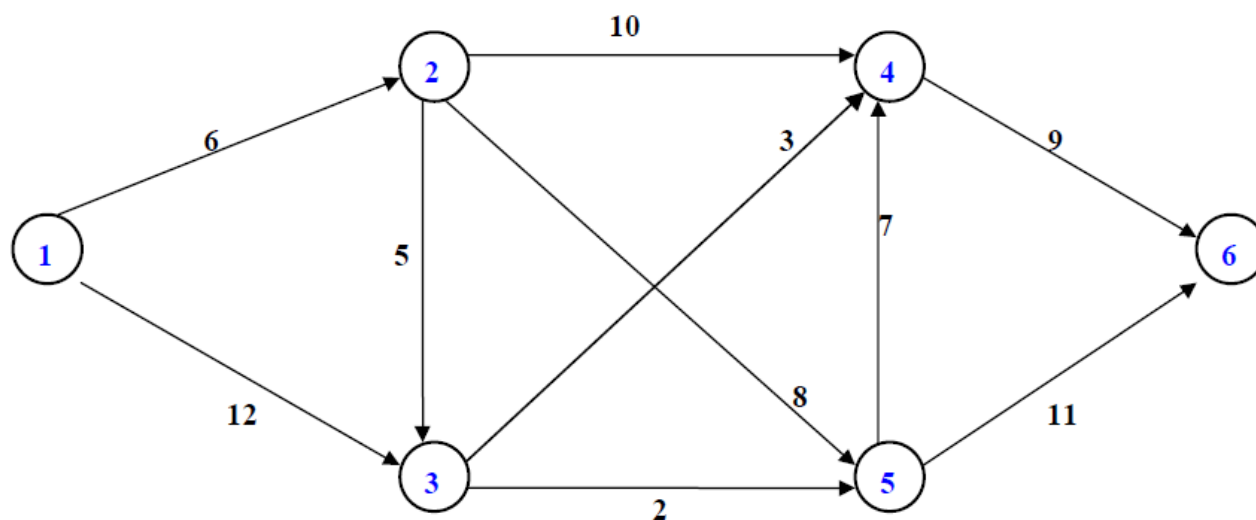
(10/60)

A book supplier has three salespersons to assign to four regions. The salespersons are to cover the regions in different amounts of time. The amount of time, in days, required by each salesperson to cover each region is shown in the table below. Which salesperson should be assigned to which region in order to minimize total time? Obtain the optimal assignment by using the Hungarian algorithm and calculate the total time.

	A	B	C	D
1	10	2	8	6
2	9	3	11	3
3	3	1	4	2

**Fifth Question****No. of Branches (2)****(10/60)**

Consider the following network, and suppose that the number adjacent to an arc represents the distance between the two nodes it connects. Find the shortest path from node 1 to each of the other nodes in the network along with the associated distances.

**End of Questions***Good Luck*